

AMENDMENTS TO THE CLAIMS:

The following Listing of Claims replaces all prior versions, and listings, of claims in the subject patent application.

Listing of Claims

Claim 1 (Previously Presented): A recording apparatus for recording a light interference pattern of at least two coherent lights into a recording medium as a spatial change of a refractive index, the apparatus comprising:

- a pulse oscillation laser for generating coherent light;
- a signal light optical system for introducing coherent signal light based on the coherent light to the recording medium via a Fourier Transform lens;
- a reference light optical system for introducing coherent reference light based on the coherent light to the recording medium;
- a spatially modulating device disposed in the signal light optical system; and
- a pulse oscillation controlling device for controlling an oscillation timing of the laser and pulse width of the laser,

wherein the pulse width is determined in accordance with a ratio between a pitch of the light interference pattern to be recorded and a moving speed of the recording medium relative to the signal light and the reference light.

Claim 2 (Previously Presented): A recording apparatus for recording a light interference pattern of at least two coherent lights into a recording medium as a spatial change of a refractive index, the apparatus comprising:

- a continuous oscillation laser for generating coherent light;
- a signal light optical system for introducing coherent signal light based on the coherent light to the recording medium via a Fourier Transform lens;

a reference light optical system for introducing coherent reference light based on the coherent light to the recording medium;

a spatially modulating device disposed in the signal light optical system;

an optical shutting device disposed in the signal light optical system for selectively passing or obstructing the signal light; and

an optical shutter controlling device for controlling an open time and an open timing of the optical shutting device,

wherein the open time is adjusted in accordance with a ratio between a pitch of the light interference pattern to be recorded and a moving speed of the recording medium relative to the signal light and the reference light.

Claim 3 (Original): The recording apparatus according to claim 1, further comprising:

a moving device for changing a position of the recording medium relative to positions of the signal light and the reference light.

Claim 4 (Original): The recording apparatus according to claim 2, further comprising:

a moving device for changing a position of the recording medium relative to positions of the signal light and the reference light.

Claim 5 (Original): The recording apparatus according to claim 1, wherein the spatially modulating device is one of a phase modulating device and an amplitude modulating device.

Claim 6 (Original): The recording apparatus according to claim 2, wherein the spatially modulating device is one of a phase modulating device and an amplitude modulating device.

Claim 7 (Original): The recording apparatus according to claim 2, wherein the optical shutting device is one of a phase modulating device and an amplitude modulating device.

Claim 8 (Canceled).

Claim 9 (Currently Amended): A reproduction apparatus for reproducing information on the basis of a light interference pattern of at least two coherent lights recorded in the recording medium as a spatial change of a refractive index, the apparatus comprising:

- a pulse oscillation laser for generating coherent light;
- a reference light optical system for introducing coherent reference light based on the coherent light to the recording medium;
- a photodetecting device for receiving diffraction light based on the reference light from the recording medium via an inverse Fourier Transform lens; and
- a pulse oscillation controlling device for controlling an oscillation timing of the laser and pulse width of the laser,

wherein the pulse width is determined in accordance with a ratio between a pitch of the recorded light interference pattern ~~to be recorded~~ and a moving speed of the recording medium relative to the signal light and the reference light.

Claim 10 (Canceled).

Claim 11 (Original): The reproduction apparatus according to claim 9, further comprising:

- a moving device for changing a position of the recording medium relative to a position of the reference light.

Claim 12 (Canceled).

Claim 13 (Original): The reproduction apparatus according to claim 9, wherein the photodetecting device is a CCD device.

Claim 14 (Canceled).

Claim 15 (Original): The reproduction apparatus according to claim 9, wherein the photodetecting device is a CMOS device.

Claims 16-18 (Canceled).

Claim 19 (Currently Amended): A recording reproduction apparatus for recording a light interference pattern of at least two coherent lights into a recording medium as a spatial change of a refractive index and reproducing the recorded pattern, the apparatus comprising:

- a pulse oscillation laser for generating coherent light;
 - a signal light optical system for introducing coherent signal light based on the coherent light to the recording medium via a Fourier Transform lens;
 - a reference light optical system for introducing coherent reference light based on the coherent light to the recording medium;
 - a spatially modulating device disposed in the signal light optical system;
 - a photodetecting device for receiving diffraction light based on the reference light from the recording medium via an inverse Fourier Transform lens; and
 - a pulse oscillation controlling device for controlling an oscillation timing of the laser and pulse width of the laser,
- wherein the pulse width for recording is determined in accordance with a ratio between a pitch of the light interference pattern to be recorded and a moving speed of the recording medium relative to the signal light and the reference light.

Claim 20 (Currently Amended): A recording reproduction apparatus for recording a light interference pattern of at least two coherent lights into a recording medium as a spatial change of a refractive index and reproducing the recorded pattern, the apparatus comprising:

- a continuous oscillation laser for generating coherent light;
- a signal light optical system for introducing coherent signal light based on the coherent light to the recording medium via a Fourier Transform lens;
- a reference light optical system for introducing coherent reference light based on the coherent light to the recording medium;
- a spatially modulating device disposed in the signal light optical system;
- a first optical shutting device disposed in the signal light optical system for selectively passing or obstructing the signal light;
- a second optical shutting device disposed in the reference light optical system for selectively passing or obstructing the reference light;
- an optical shutter controlling device for controlling an open time and an open timing of the first optical shutting device and the second optical shutting device; and
- a photodetecting device for receiving diffraction light based on the reference light from the recording medium via an inverse Fourier Transform lens,

wherein an area of the photodetecting device is selected in accordance with the open time of the optical shutting device, and

wherein the open time of the first optical shutting device for recording is adjusted in accordance with a ratio between a pitch of the light interference pattern to be recorded and a moving speed of the recording medium relative to the signal light and the reference light.

Claim 21 (Original): The recording reproduction apparatus according to claim 19, further comprising:

- a moving device for changing a position of the recording medium relative to positions of the signal light and the reference light.

Claim 22 (Original): The recording reproduction apparatus according to claim 20, further comprising:

a moving device for changing a position of the recording medium relative to positions of the signal light and the reference light.

Claim 23 (Original): The recording reproduction apparatus according to claim 19, wherein

the spatially modulating device is one of a phase modulating device and an amplitude modulating device.

Claim 24 (Original): The recording reproduction apparatus according to claim 20, wherein

the spatially modulating device is one of a phase modulating device and an amplitude modulating device.

Claim 25 (Previously Presented): The recording reproduction apparatus according to claim 20, wherein

each of the first optical shutting device and the second optical shutting device is one of a phase modulating device and an amplitude modulating device.

Claim 26 (Original): The recording reproduction apparatus according to claim 19, wherein

the photodetecting device is a CCD device.

Claim 27 (Original): The recording reproduction apparatus according to claim 20, wherein

the photodetecting device is a CCD device.

Claim 28 (Original): The recording reproduction apparatus according to claim 19, wherein

the photodetecting device is a CMOS device.

Claim 29 (Original): The recording reproduction apparatus according to claim 20, wherein

the photodetecting device is a CMOS device.

Claim 30 (Canceled).

Claim 31 (Currently Amended): A recording/reproducing apparatus for recording a light interference pattern of at least two coherent lights into a recording medium as a spatial change of a refractive index and reproducing the recorded pattern, the apparatus comprising:

a continuous oscillation laser for generating coherent light;

a signal light optical path for introducing coherent signal light based on the coherent light to the recording medium, the signal light optical path including a first optical shutter, a second optical shutter downstream of the first optical shutter, a spatial modulator downstream of the second optical shutter and a Fourier Transform lens downstream of the spatial modulator;

a reference light optical path for introducing coherent reference light based on the coherent light to the recording medium, the reference light optical path including a third optical shutter;

an optical shutter controlling device for controlling open times and open timings of the first, second and third optical shutters, wherein the open time and open timing of at least the second optical shutter is adjusted for recording in accordance with a ratio between a pitch of the light interference pattern to be recorded and a moving speed of the recording medium relative to the signal light and the reference light; and

a photodetecting device for receiving diffraction light based on the reference light from the recording medium via an inverse Fourier Transform lens.

Claim 32 (Previously Presented): A recording apparatus for recording a light interference pattern of at least two coherent lights into a recording medium as a spatial change of a refractive index, the apparatus comprising:

a pulse oscillation laser for generating coherent light;

a signal light optical path for introducing coherent signal light based on the coherent light to the recording medium, the signal light optical path including a spatial modulator and a Fourier Transform lens;

a reference light optical path for introducing coherent reference light based on the coherent light to the recording medium; and

a pulse oscillation controlling device for controlling an oscillation timing of the laser and pulse width of the laser,

wherein the pulse width of the laser is less than or equal to $(0.78 \times K)/V$ sec, where K is a pitch of the light interference pattern to be recorded and V is a moving speed of the recording medium relative to the signal light and the reference light.

Claims 33-35 (Canceled).